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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/585,408	07/07/2006	Toshihisa Nozawa	33082M335	2529

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SMITH, GAMBRELL & RUSSELL
1130 CONNECTICUT AVENUE, N.W., SUITE 1130
WASHINGTON, DC 20036

EXAMINER	
CHEN, KEATH T	

ART UNIT	PAPER NUMBER
1792	

MAIL DATE	DELIVERY MODE
12/23/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/585,408	NOZAWA ET AL.	
	Examiner	Art Unit	
	KEATH T. CHEN	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 November 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-5,8 and 10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-5,8 and 10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The claim amendment filed on 11/17/2008, addressing claims 1-10 rejection from the first office action (07/15/2008) by amending claims 2, 8, and 10 and canceling claims 1, 6-7, and 9 is entered, and will be addressed below.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35 U.S. Code not included in this action can be found in a prior Office action.

2. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kenji (JP 02-055292, hereafter '292), in view of Amai (US 20030034056, hereafter '056).

'292 teaches some limitations of:

Claim 10: A substrate processing apparatus (Fig. 1) for processing a substrate (#3, Fig. 3, part that being omitted in Fig. 1) for manufacturing a semiconductor device, comprising an object (1A, reactor wall) to be cooled (English abstract, Constitution, lines 5-11), the apparatus further comprising; a mist generator (water #11, ultrasonic vibrator #13 and #12 container) that generates a mist (droplet #11A, line 11); a carrier-gas (#14) supply source that supplies a carrier gas for carrying the mist generated in the mist generator; and a mist passage (double wall between outlet tube #6 and inner wall #1, line 7) through which the mist carried by the carrier gas flows to cool the object. (original claim 1).

'292 does not teach the other limitations of:

Claim 10: a gas-liquid separator that separates the mist circulated in the mist passage from the carrier gas, and collects the separated mist as a liquid, wherein the mist generator generates the mist from the liquid collected by the separator.

'056 is an analogous art in the field of semiconductor processing (field of the invention), particularly in recovering the cleanness of the processing liquid for reuse ([0004], last sentence). '056 teaches mist-trap/gas-liquid separator (#132, Fig. 5, [0087]) and then reused (through pipe #134 and recovery path #137, [0111]).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to add a mist trap/gas-liquid separator, as taught by '056, to the apparatus in Fig. 1 of '292.

The motivation to add a gas-liquid separator is to recovering the clean liquid, as taught by '056 ([0004]).

3. Claims 8, 2, and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Kenji (JP 02-055292, hereafter '292), in view of Seikyu et al. (JP 2003-174016, hereafter '016), McMillen et al. (US 5316579, hereafter '579), and Moulene et al. (US 5034688, hereafter '688).

'292 teaches some limitations of:

Claim 8: A substrate processing apparatus (Fig. 1) for processing a substrate (#3, Fig. 3, part that being omitted in Fig. 1) for manufacturing a semiconductor device, comprising an object (1A, reactor wall) to be cooled (English abstract, Constitution, lines 5-11), the apparatus further comprising: a mist generator (water #11, ultrasonic vibrator #13 and #12 container) that generates a mist (droplet #11A, line 11); a carrier-gas (#14) supply source that supplies a carrier gas for carrying the mist generated in the mist generator; and a mist passage (double wall between outlet tube #6 and inner wall #1, line 7) through which the mist carried by the carrier gas flows to cool the object. (original claim 1).

'292 does not explicitly teach the other limitations of:

Claim 8: a temperature sensor that detects a temperature of the object; and a controller that controls the mist generator and the gas supply source, based on a temperature detected by the temperature sensor; (original claim 6) the controller carries out a control operation to stop a supply of the mist from the mist generator, while continuing a supply of the carrier gas from the gas supply source, when the detected temperature of the temperature sensor is not more than a reference value.

Applicant's claim requirements "the controller carries out a control operation to stop a supply of the mist from the mist generator, while continuing a supply of the carrier gas from the gas supply source ..." are considered intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim

(*Walter*, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (*In re Casey*, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02). When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (*In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).

'016 is an analogous art in the field of plasma etching of semiconductor (English translation [0001] and [0002]), particularly in cooling of a processed object ([0015]). '016 teaches a temperature sensor (#129. [0068]) that detects the temperature of the object/susceptor/electrode (#104, [0068]); a controller/CPU (#131, [0069], line 2) that control the flow of mist/refrigerant regulating valve ([0069], line 2, including closing the valve, [0043]) based on the temperature measurement ([0069], line 1); of a plasma etching apparatus ([0001]) with mist generator (#115. [0039] and [0043]).

'579 is an analogous art in the field of liquid source CVD (field of the invention), particularly in generating fine mist (field of the invention). '579 also teaches temperature sensors and a controller (#136, Fig. 5, col. 10, lines 24-25) that control the manifold/mist and the gas (through valve #154), which is a carrier gas in Fig. 4 (col. 7, lines 3-27).

'688 is an analogous art in the field of temperature control of semiconductor wafer (col. 1, lines 8-18), particularly in thermal fluid cooling. '688 teaches on/off control of fluid (col. 3, lines 53-57); specifically, to stop the cooling fluid (col. 5, lines 49-50) when the temperature reaches a lower temperature threshold (col. 5, lines 44-49).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have added a controller and temperature sensor to control the mist/refrigerant ([0070]), as taught by '016, and to control both the mist generator/manifold and carrier gas, as taught by '579, to the apparatus of Fig. 1 of '292 (original claim 6). Furthermore, to turn off the mist generator supply, as taught by '688, when the temperature of the sensor in below a reference value/threshold, while continuing a supply of the carrier gas (the examiner takes official notice that it is a common knowledge to keep the cooling mechanism in a stand-by mode so as to restart the cooling on demand).

The motivation to add temperature sensor and controller is to control the temperature of the object, as taught by '016 ([0069]). The motivation to control both the mist generator/manifold and carrier gas is for precise control, as taught by '579 (col. 10, lines 24-25). The motivation to apply on/off control is suitability. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. MPEP 2144.07.

'292 further teaches the limitations of:

Claim 2: The substrate processing apparatus according to claim 8, wherein the object is at least a part of a processing vessel (reaction vessel #7, line 12 of English abstract) in which a substrate received (#3, Fig. 3, part that being omitted in Fig. 1) therein is processed.

'016 further teaches the limitations of:

Claim 3: The substrate processing apparatus according to claim 2, wherein the substrate is processed in the processing vessel with the use of a plasma ([0001]).

4. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over '292, '016, '579, and '688, further in view of Hiroyuki et al. (JP 2001-156047, hereafter '047).

'292, '016, '579, and '688, together, teach all limitations of claim 2, as discussed above. '292 further teaches the limitations of:

Claim 4: The substrate processing apparatus according to claim 3, further comprising a heater (high frequency power heater #5, Fig. 3, part that being omitted in Fig. 1, last paragraph of the upper left panel of page 2) that heats the object, at least when no plasma is generated.

'292 does not explicitly teaches the limitations of:

Claim 3: The substrate processing apparatus according to claim 2, wherein the substrate is processed in the processing vessel with the use of a plasma.

Claim 5: The substrate processing apparatus according to claim 2, further comprising a heating furnace that receives the processing vessel, wherein the mist passage is formed as a space defined between the processing vessel and the furnace.

'047 is an analogous art in the field of semiconductor manufacturing device, particularly in cooling body of a reaction chamber (English translation, [0001] field of the invention). '047 teaches a plasma ([0002], line 3, and the HF source at the bottom of Fig. 1) reaction chamber (#13, [0015], line 4) with nozzle (#19) to supply liquid refrigerant to the cooling passage/double wall ([0016]) between #13 and #13a in a misty state. '047 further teaches the outer wall embeds heating means ([0021]); therefore, outer wall #13 is a heating furnace that receives the processing vessel with mist passage in between the processing vessel and the furnace. '047 is silent on the details of the mist generation apparatus.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have added a heating furnace and arranged cooling passage between the double wall, as taught in Fig. 1 of '047, to the combined apparatus of '292, '016, '579, and '688.

The motivation to add a heating furnace and arrange cooling passage between the double wall is suitability. The selection of something based on its known suitability

for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, U.S. 327, 65 USPQ 297 (1945).

Response to Arguments

Applicant's arguments filed on 11/17/2008 have been fully considered but they are not persuasive.

5. Applicants' arguments with respect to the amended claim 8 is that Kenji '292, Seikyu '016, and McMillen '579, in combination, do not teach a controller that carries out a control operation to stop supply of mist from the mist generator and continues a supply of the carrier gas, see the first to the third complete paragraph of page 5.

This argument is found not persuasive for two reasons.

First of all, the action of the controller is an intended use of the apparatus. The combined apparatus of '292, '016, and '579 is capable of turn-off the mist generator supply and continues supply of the carrier gas to the mist generator.

Secondly, the new ground of rejection cites a new reference US 5034688 that teaches the on/off control of a cooling system. Additionally, the stand-by mode of a cooling mechanism is a common knowledge in order to respond to the on/off demands of the control action.

6. In regarding to the claim 10 based on '292 and Amai '056, Applicants' argument is '056 discloses separating the gas, not the mist, see the third paragraph of page 6.

This argument is found not persuasive for two reasons.

'056 clearly teaches the separation of gas-liquid separation in a mist trap #132, and to reuse the cooling liquid ([0102]), similar to Applicants' gas-liquid separator.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEATH T. CHEN whose telephone number is (571)270-1870. The examiner can normally be reached on 6:30AM-3 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. T. C./
Examiner, Art Unit 1792

/Ram N Kackar/
Primary Examiner, Art Unit 1792